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ABSTRACT

The paper reviews theories of Lev Vygotsky, founder of the Soviet school of cognitive developmental psychology and an architect of Soviet defectology, the discipline concerned with physically and mentally handicapped children. Three of his basic concepts are explained: (1) "cultural" versus "natural" mental functions; (2) material and symbolic tools; and (3) the dialogical character of learning. Implications of his theories for deaf education are considered, including his conclusion that polyglossia--the acquisition of speech by various verbal means--is the unique feature of the deaf child's development and the most productive path to the child's intellectual growth. Current practice in deaf education in the Soviet Union is modeled on Vygotsky's principles and those of his students and his collaborator, A. Luria. The evolution of Vygotsky's thinking concerning sign language is discussed. (CL)

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VYGOTSKIAN TRADITION IN THE PSYCHOLOGICAL STUDY OF HANDICAPPED, PARTICULARLY DEAF CHILDREN

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VYGOTSKIAN TRADITION IN THE STUDY OF HANDICAPPED, PARTICULARLY DEAF CHILDREN

Three Vygotskian concepts had a great impact on the development of Soviet "defectology"(a discipline that studies handicapped children and designs programs for special education): 1) The concept of "cultural" versus "natural" mental functions; 2) The concept of material and symbolic tools; and 3) The concept of dialogical character of learning. Vygotsky argued against the compensatory natural training of the intact senses, suggesting that cultural higher mental functions should be built using intact systems. Higher mental functions develop with the help of psychological tools-mediators, but it is not tools or signs themselves which serve as mediators, but the meaning encoded in them. Theoretically, then, the type of sign system should not matter, as long as the meaning is retained. Originally, however, Vygotsky rejected what he called "mimicry" (actually, mimed gesticulated language) as a viable means of instruction, apparently because he perceived such a language as a natural rather than cultural mental function. Later on Vygotsky recognized that sign language constitutes a well developed communicative systen that forms an essential part of the polyglossal process of language acquisition by deaf children. He came to conclusion that polyglossia -- the acquisition of speech by various verbal means -- is the unique feature of the deaf child's development and the most productive path of the child's intellectual growth. The idea of polyglossal education of deaf has been successfully implemented by contemporary Soviet followers of Vygotsky.

VYGOTSKIAN TRADITION IN THE PSYCHOLOGICAL STUDY OF HANDICAPPED, PARTICULARLY DEAF CHILDREN

Lev Vygotsky*(1896-1934), who is primarily known in this country as a pioneer psycholinguist and contributor to cognitive theory of schizophrenia, has a much broader recognition in the USSR. He is an undisputable founder of the Soviet school of cognitive developmental psychology, still one of the most controversial theorists, and in addition to this, the founding father of Soviet defectology, a discipline concerned with the study of physically and mentally handicapped children.

J. Wertsch's recent description of Vygotsky "as a polyphonic thinker" gives us a better understanding of the full scope of this man's work [illegible] (1985 , p. 66). Wertsch writes about Vygotsky, "His life goal was to create a psychology that would be theoretically and methodologically adequate for the investigation of all aspects of human consciousness " (ibid). In assessing Vygotsky's specific contribution as the founding father of defectology, the question arises, "How does Vygotsky's advocacy of a special pedagogy for the deaf, the use of many significant sign factors, and the modulation of the social consequences of deafness relate to his primary concepts?" In attempting to answer this question, our study will illustrate how Vygotsky's various proposed strategies do derive from certain fundamentals which serve as the basis for all his theoretical writings. In this respect, it is hoped that some light will be shed on the links between Vygotsky the theorist, Vygotsky the clinician and Vygotsky the pedagogue.

In order to understand the nature of the influence which Vygotsky's ideas exercised upon the development of defectology--an influence spanning more than half a century and involving a number of research institutions and educational centers--one must get acquainted with some basic concepts and theoretical formulas

* The already standardized spelling of the last names of the three well known Soviet psychologists, L. Vygotsky, A. Leontiev, and A. Luria will be used in place of the correctly transliterated forms (Vygotskij, Leont'ev and Lurija). All other names will be transliterated according to the Library of Congress system.

that have long since become the trademark of Vygotskian tradition. Among these concepts we find the notion of activity, higher vs. natural mental functions, the concept of interfunctional relations, spontaneous vs. scientific concepts, and the 'zone of promimal development'.

Vygotsky's research program began taking shape already in his early paper "Consciousness as a problem of psychology of behavior" (1925/1979). The major goal of that paper was to restore the legitimacy of the concept of consciousness, but not at the expense of a return to introspective mentalistic psychology. The major objection Vygotsky had against the mentalistic tradition was that it confined itself to a vicious circle in which states of consciousness are "explained" through the concept of consciousness. Vygotsky argued that if one is to take consciousness as a subject of study then the explanatory principle must be sought in some other layer of reality. Vygotsky suggested that socially meaningful activity (Tätigkeit) may play this role and serve as a generator of consciousness.

The first step toward establishing this principle was taken by Vygotsky when he suggested that individual consciousness is formed from outside through relations with others. He explained: "The mechanism for knowing oneself and the mechanism for knowing others are one and the same...We are aware of ourselves in that we are aware of others; and in analogous manner, we are aware of others because in our relationship to ourselves we are the same as others in their relationship to us. I am aware of myself only to the extent that I am another for myself..." (Vygotsky 1979, p. 29). One cannot but find a startling similarity between the above mentioned statement by Vygotsky and the concept of significant symbols developed by G.H. Mead: "As we shall see, the same procedure which is responsible for the genesis and existence of mind or consciousness--namely, the taking of the attitude of the other toward one's self, or toward one's own behavior--also necessarily involves the genesis and existence at the same time of significant symbols, or significant gestures" (Mead 1934/1974, pp. 47-48). It seems that Mead's revision of behaviorism

and Vygotsky's struggle for consciousness had much in common: both authors pointed to the same phenomena and followed similar methodological paths.

According to Vygotsky, the higher mental functions of humans must be viewed as products of mediated activity. The role of mediator is played by psychological tools and the means of interpersonal communication. The concept of the psychological tool first appeared in loose analogy with the material tool that serves as a mediator between the human hand and an object of action. Vygotsky obviously was under the influence of the Hegelian notion of the "cunning of reason." Reason's cunning consists principally in its mediating activity which, by causing objects to act and react on each other in accordance with their own nature, in this way, without any direct interference in the process, carries out reason's intentions (see Vygotsky 1978, p. 54). Like material tools psychological tools are artificial formations. Both are social in nature, but while material tools are aimed at the control over processes in nature, psychological tools master natural forms of behavior and cognition in the individual. Although sensory-motor schemas connected with practical actions also may become psychological tools, the latter usually have a semiotic nature. Vygotsky considers that gestures, language and sign systems, mnemonic techniques, and decision making systems based on casting lots are simply psychological tools.

Psychological tools are internally oriented transforming the natural human abilities and skills into higher mental functions. For example, if a simple and elementary act of memorizing connects event A with event B through the natural ability of the human brain, then in mnemonics this relation is replaced by two others: A to X, and X to B, where X is an artificial psychological tool like a knot in a handkerchief, a written note or a mnemonic scheme.

Vygotsky thus made a principal distinction between "lower", natural mental functions such as elementary perception, memory, attention and will, and the "higher" or cultural functions which are specifically human and which appear gradually in a course of radical transformation of the lower functions. The lower functions do not disappear in a mature mind, but they are structured and organized according to specifically human social goals and means of conduct. Vygotsky used the Hegelian term "superseded" (aufgehoben) to designate the transformation of natural functions into cultural ones.

If one decomposes a higher mental function into its constituent parts one finds nothing but the natural, lower skills. This fact, argued Vygotsky, secures the scientific status of his method, which needs no speculative metaphysical categories to approach the higher forms of behavior. All the building blocks of higher behavior seem absolutely materialistic and can be apprehended by ordinary empirical methods. The latter assumption does not imply, however, that the higher functions can be reduced to lower ones. Decomposition shows only the material with which the higher functions are built, but says nothing about their construction.

The constructive principle of the higher functions lies outside the individual--in psychological tools and interpersonal relations. Referring to psychological tools as instruments for the construction of higher functions Vygotsky wrote: "In the instrumental act, humans master themselves from the outside--through psychological tools" (Vygotsky 1981, p. 141).

In what concerns the structural role of interpersonal relations Vygotsky followed Pierre Janet, who claimed that intrapersonal processes are just transformed interpersonal relations. "Each function in the child's cultural development appears twice: first, on the social level, and later,

on the individual level; first between people (interpsychological), and then inside a child's (intrapsychological)" (Vygotsky 1978, p. 57).

In concrete experimental practice the idea of internalization of psychological tools acquired two different, and ultimately even conflicting forms. Internalization as the process of transformation of external actions into internal psychological functions was thoroughly studied by such followers of Vygotsky as Petr Zinčenko, Aleksandr Zaporožec, and Petr Galperin. Their studies undoubtedly had much in common with Piaget's concept of the development of intelligence through the internalization of sensory-motor schemas.

Vygotsky himself, however, was much more interested in the problem of internalization of symbolic psychological tools and social relations. He was greatly impressed by works of French sociological school of Emil Durkheim, and by related ideas of Maurice Halbwachs, Charles Blondel and Pierre Janet, who studied the internalization of so-called collective representations.

To understand in what direction Vygotsky's thought was moving, consider the following problem: how the indicatory gesture appears in child's behavioral repertoire? At first it is simply an unsuccessful grasping movement directed at an object. Vygotsky used the term "gesture-in-itself" to designate this stage of the development of a gesture. When a mother comes to the aid of her child the situation acquires a different character. A gesture "in-itself" becomes a gesture "for others." Others, a mother in our case, interpret a child's grasping movement as an indicatory gesture, thus turning it into a socially meaningful communicative act. Only afterwards does the child become aware of the communicative power of his movement. He then starts addressing his gesture to adults, rather than the object that was the focus of his

interest in the first place. It is essential that the child is the last person who consciously apprehends the meaning of his own gesture. Only at this later stage does gesture become a gesture "for-oneself."

From 1926 through 1930 the focus of Vygotsky's research program occurred in the experimental study of the mechanisms which transform natural psychological functions into higher functions such as logical memory, selective attention, decision making and comprehension of language. Besides Alexander Luria and Alexei Leontiev, who joined Vygotsky as early as 1924, his group of collaborators included Lidija Božovič, Aleksandr Zaporožec, Natal'ja Morozova, Roza Levina, Lija Slavina, Lev Saxarov and Zozefina Šif. Their studies developed along three avenues of research: instrumental, developmental, and cultural-historical.

The instrumental aspect of this research focuses on the use of external means, i.e. psychological tools which facilitate the development of higher forms of memory, attention and decision making. Here Alexei Leontiev's study of natural and instrumentally mediated memory remains a classic (Leontiev 1932). In his experiments children were asked to memorize several colors that would be "forbidden" according to the rules of the play and should not be named while answering the experimenter's questions. Colored cards were offered to the children as possible aids. The results showed that children of preschool age failed to make use of the colored cards. They made as many mistakes, naming "forbidden" colors, with cards as without them. Adolescents, on the contrary, used cards extensively, separating out forbidden ones and consulting with them before they answered. The percent of mistakes was much higher when the experiment was conducted without cards. It is interesting that for adults the performance with cards was not significantly better than without them, although in both cases was better than on the case of adolescents. Vygotsky explained this as a result of internalization. Adults do not cease

to use psychological tools to structure their memory, but their tools are emancipated from the material form of the color card. The external sign that school children need is transformed by adults into an inner sign.

Although the concept of higher mental functions embraced such functions as memory, attention, will, etc., Vygotsky himself was primarily interested in the development of language in connection with concept formation. A study of concept formation in children, thus, originated in the framework of an instrumental model but later went beyond the original schema. Vygotsky argued that it is not the development of a single function which should be made a center of study, but rather the development of an interfunctional system, like that of verbal intelligence. Neither language, nor thought can be adequately described unless the history of the changing relationships between these two functions is revealed. Later this idea of functional systems became a theoretical basis of Luria's neuropsychological works (Luria 1981).

But let us return to a study of concept formation. Using the method of "double stimulation," i.e. marking each object in the sorting test by a coded triplet of letters, Vygotsky succeeded in setting up an experimental situation in which the instrumental process of sorting and classification revealed a correspondent stage in the development of a child's concepts. Vygotsky discovered a number of such stages from that of unorganized "congeries" through that of "complexes" and pseudo-concepts to that of scientific, logical concepts (Vygotsky (1986,pp.96-145).

In the work of his student, Žozefina Šif, a study of concept formation was extended to an educational setting (Šif 1935). Different forms of child experience were put into correspondence with the appropriate stages in the development of concept formation. In this respect Vygotsky's study closely resembled that of Heinz Werner (Werner 1948). It is not surprising that Werner's disciples enthusiastically used Vygotsky's sorting test in

their study of the preconceptual thinking of schizophrenics (Hanfmann & Kasanin 1942). Vygotsky observed that preconceptual and even "mythological" thinking is characteristic not only for children, but also forms the basis for the quotidian thinking in adults. This latter perspective, like many others, has been neglected by Vygotsky's disciples, and the problem of everyday behavior remained practically untouched in Soviet studies.

Vygotsky distinguished two forms of experience which give rise to two different, albeit interrelated, groups of concepts. The first group, which Vygotsky designated as scientific has its roots in specialized and operationalized activity of educational instruction which imposes scientifically defined concepts upon a child. The second group, which comprises concepts emerging from the reflection upon everyday experience of child, was labeled spontaneous concepts.

Vygotsky made it a point to argue that scientific concepts far from being units assimilated by a child in a ready-made form, in reality undergo substantial development. This development essentially depends on the existing level of the child's ability to comprehend concepts. The level of comprehension, in its turn, is connected with the development of spontaneous concepts. "In working its way slowly upward, an everyday concept clears a path for the scientific concept in its downward development. It creates a series of structures necessary for evolution of a concept's more primitive, elementary aspects, which give it body and vitality. Scientific concepts in turn supply structures for the upward development of the child's spontaneous concepts toward consciousness and deliberate use" (Vygotsky, 1986, p. 194).

Two forms of learning were thus distinguished. One of them, a highly structured learning in educational setting later attracted the total attention of Soviet psychologists and have been thoroughly investigated in the works of Vasilij Davydov (1972; 1983) and Petr Galperin (1969). The much less

articulated spontaneous learning of a child was perceived rather as an obstacle on the road of concept formation, and its characteristic features were mostly neglected.

The study of concept formation in an educational setting helped Vygotsky develop the idea of the dialogical character of learning. In his analysis Vygotsky took as a point of departure what he perceived as the inability of Piaget's theory to reconcile the spontaneous character of child's reasoning with the scientific--and thus adult--nature of concepts learned at school. Where Piaget saw confrontation, Vygotsky found dialogue. Vygotsky was also critical of those methods of mental testing that routinely took into account only the progress made by the child who is left alone to perform a task. Vygotsky argued that progress in concept formation which is achieved in cooperation with an adult would be a much more sensitive gauge for a child's intellectual abilities. The area that lies just ahead of a child's independent achievements was named Zone of Proximal Development (Zo-ped). Zo-ped is a "meeting place," i.e. the place where a child's empirically rich but disorganized spontaneous concepts meet the systematicity and logic of adult reasoning. As a result of such a "meeting" the weak points of spontaneous concepts are compensated by the strong aspects of scientific ones. The depth of Zo-ped varies reflecting a child's relative abilities to appropriate structures introduced by adults. The final product of this child-adult cooperation is the solution of a problem which once internalized becomes an integral part of the child's own reasoning.

In turning to the contributions of the Vygotsky's school to present studies of post-natal development of children with physical and mental handicaps, it is necessary to single out those fundamentals which not only

characterize this school but also those which have become the underlying scientific principles for modern Soviet defectology. Vygotsky approached the personality of each child as a unique interrelationship of organic and psychological functions, i.e., each child has a unique organic and psychological structure. This is the fundamental psychological principle underlying all Vygotsky's work in the area of handicapped children. In The Fundamentals of Defectology, published for the first time in 1983 long after his death,[1] Vygotsky states, "A child whose development is impeded by a handicap is not simply a child less developed than his peers; rather he has developed differently." (Vygotsky 1983, p. 7). In each stage of his growth, a handicapped child represents "a qualitatively different, unique type of development" (ibid). In this work on the development of handicapped children, Vygotsky leans strongly on A. Adler's study of abnormal psychology which postulates that any limitation or abnormality continually stimulates and intensifies higher development, i.e., "if any organ, due to morphological or functional abnormality, does not fully cope with its tasks, then the central human nervous system and mental apparatus compensate for the organ's deficient operation by creating a psychological superstructure which shores up the abnormal organism at its weakened, threatened point" (ibid., p.10). For example, if a hearing loss occurs, then the other sensory systems (sense of taste, touch, sight, etc.) takes over in processing external signs and stimuli.

In the great tradition of Russian linguists Vygotsky insists on the priority of semantics. This second guiding principle has had great impact on the problem of selecting alternative compensatory means required for the development of handicapped children. It is not the tools or signs in and of themselves which are retained in and organize long-term memory but the

meaning encoded in the signs. Theoretically, then, the type of sign system should not matter. Because any child acquires language through interaction with his world and because a deaf or blind child interacts differently with his environment, his environment must be specifically and uniquely controlled to enhance his compensatory responses and his language development. Such is the task which Vygotsky placed before all modern Soviet defectologists when establishing a special educational system for the deaf. Such a view strongly supports the establishment of special schools with a uniquely manipulated environment best suited for a deaf child.

This approach to the psychological and intellectual development of a deaf child raises many heretofore unanswered questions about the exact effect of this handicap on development and about the nature of the compensatory sign system most advantageous for language acquisition in the deaf. These are questions which still plague linguists, psychologists, and educators of the deaf in this country. For example, there are many institutions in the United States today where research is being conducted on the linguistic structure of American Sign Language--the Department of Linguistics, Northeastern University and the Research Institutes of Gallaudet College, Washington, D.C. and the University of California. In any thorough study of language acquisition in the deaf, the determination of the linguist structure of thought for a person deprived of the knowledge of sound is extremely problematic. Many scholars, however have come to the conclusion that linguistic paucity is a commonly observed phenomenon among the deaf only when the basis for evaluation is a knowlege of the socially dominant code, i.e., spoken language. In light of this potential limitation one question does arise: is the personality or mental development of a deaf child stymied by the nature of his handicap

or will his other sensory systems overcompensate in the process of language acquisition, insuring a normal and healthy growth of higher psychological functions?

The principle goal Vygotsky set for educators of the deaf is the full development of a child's personality and consciousness through meaningful interaction with the world in which he must operate with the help of the specific tools readily available to a particular child. Since, as has been shown above, language is the primary tool in manipulating and interacting with the environment, paramount importance must be placed on the teaching of language and on surmounting the main obstacle which stands in the way of every deaf child, i.e. the impairment of that very sensory system which is thought to predominate in the intake of information about the environment--the hearing system. Two specific fundamentals must, in Vygotsky's point of view, be kept in mind when setting up a system of special education for the deaf: 1) meaning is never limited to the spoken word alone but is also conveyed by many other significant sign factors, such as facial expressions, intonation , gestures, pantomime, which taken altogether determine the sense or ultimate motivation behind communication; 2) language acquisition is a "living" process and as such is the result only of meaningful interaction with others and the environment and NOT the product of rote memory of "dead language," i.e., phonetics and articulation reproduced artificially without meaningful context.

In his essay on special education for the deaf, written in 1925 and published for the first time in 1983, Vygotsky reintroduces a Pavlovian notion with the statement "From the point of view of physiology any educational process may be seen as a process of developing conditional reflexes in

response to certain signs and signals" (Vygotsky 1983, p. 103). The human being may then be trained to respond to any external stimuli which comes from the eye, ear, skin and so forth. "This means," according to Vygotsky, "that the physiological substrata of the educational process, i.e., those physiological changes which may be introduced by educational influences on the child's organism, will in essence and in nature be absolutely identical in all cases: both light and sound can, therefore, function in a completely analogous physiological role" (ibid.). Thus, for Vygotsky, it is a fundamental law that the educational content be the same for both handicapped and normal children; the entire difference lies in the fact that one organ of perception takes over for another, while "the qualitative content of the reaction remains the same" (ibid.). Central to this position is the view that the deaf child is entirely capable of full psychological and intellectual development, i.e., an active, useful life. In Vygotsky's words, "the uniqueness of this type of education simply boils down to the substitution of one path of training for another" (ibid., p. 14).

The primary problem of a handicapped condition is, generally speaking, not the handicap in and of itself but its social consequences. This secondary effect becomes the major difficulty because while the handicapped child does not consider himself "handicapped," he is seen from the point of view of others (the non-handicapped) as a social abnormality. Addressing this concern, Vygotsky writes:

> Any physical handicap--be it blindness or deafness--not only alters the child's relationship with the world, but above all affects his or her interaction with people. Any organic defect is realized as a social abnormality in behavior. It is understandable, of course, that blindness and deafness in and of themsleves are biological factors and to no degree social factors. However, the educator must

> deal not so much with these factors by themselves, as much as with their social consequences. When we have before us a blind boy as the object of education, then it is necessary to deal not so much with blindness by itself, as with those conflicts which arise for a blind child upon entering life.
>
> (Vygotsky 1983, p. 102).

Counteracting the effects of society's negative attitude and establishing normal and positive social interaction become the essential tasks facing educators of the deaf. The groundwork for a child's entire educational development must begin in early childhood so that his adult educators and intercessors can begin immediately to manipulate the environment by creating circumstances and attitudes best suited for the development of all his sensory systems. Only in such a setting can language acquisition become a real possibility for a deaf child, making use of all the means available to him. While at home, mimed gesticulated skills have no doubt been already strengthened by deaf parents, here in this specially manipulated environment, other skills are added, such as lip reading, imitation of oral speech, finger spelling, game playing, pantomime, writing, reading and story telling by pictures. Following Vygotsky's fundamental principles, the educational process should implement all possible tools in real situations which foster normal social activity and, most importantly, work. The environment of the internat, the Soviet special school for the deaf, must be one of rehabilitation, training the child to become a useful and active participant in society. Pity and philanthropy have no place in a healthy society. How these strategies proposed by Vygotsky for a special education system are implemented today by present-day pedagogues will be shown below.

As indicated above, the second Vygotskian principle governing the special educational system for the deaf concerns the methods of teaching

language and, above all, speech. In The Fundamentals of Defectology, Vygotsky writes: "The states and phases of speech development should be the same for a deaf child as for a normal child: the difference lies only in the means, the methods and time" (Vygotsky 1983, p. 106). A deaf child, as is the case of the normal child, should be introduced to "live speech," i.e., integral forms of speech, phrases and words which carry meaning for the child in his specific environment. In play, work, and in the daily life of the boarding school, functional and communicative speech should be used. According to Vygotsky, active interest in speech will be killed, if it is introduced by the old traditional methods of teaching the deaf speech--those artificial measures of repeating isolated elements or sounds. Articulation in and of itself is not meaningful, "live" speech but "dead language." Vygotsky claims that, "if we were to wait until a child has learned to correctly utter each sound and only after this teach him to put sounds together into syllables, and syllables into words, if we were to proceed from the elements of speech to its synthesis, we would never hear from a child live, authentic speech. The reverse path seems more natural--mastering integral forms of speech before the individual elements and their combination. Both in phylogenetic and ontogenetic development a phrase precedes a word, a word a syllable, a syllable--a sound. Even a separate phrase is almost an abstraction; speech arises rather in greater wholes than the sentence. Therefore, speech comes to children as something intelligible, necessary, and vitally essential" (Vygotsky 1983, p. 105).

In examining the nature of thought and its relationship to language, Vygotsky asserts that a thought is a complex whole, "engendered by motivation, i.e., by our desires and needs, our interests and emotions (Vygotsky 1986,

p.252 e). In the process of acquiring language then a child first understands the whole intent of a thought and not the separate units of speech. Moreover, he perceives speech as something inseparable from other significant factors, such as intonation, facial expressions, and shared context. Only later does he learn to break it down into its structural parts and isolated phonetical elements. Vygotsky considered that formerly traditional speech programs for the deaf proceeded in the wrong direction by beginning with tedious drills of sounds without regard to sense and thus stifling all natural desire to learn speech. (Unfortunately, this is still true in many speech programs in American schools.)

Today in the Soviet Union, the theoretical and clinical research carried on by Vygotsky and his collaborators has been widely adopted and put into practice. According to K. Gibson's article on deaf education in the USSR, current Soviet educators of the handicapped have learned from Vygotsky and Luria "how the social environment affects learning and how manipulation of the environment produces maximally desired learning" (Gibson 1980, pp. 264-267). This influence is reflected in the methodology recently outlined in a 1978 survey by the Ministry of Education and Academy of Pedagogical Sciences, Hearing Impaired Children and the System of their Education (Foman 1978). This report sets forth as the basis of such an educational system special corrective methods which allow the remaining healthy sensory systems to compensate for the initial handicap. The survey cites the research of R.M. Boskis who reiterates Vygotsky's basic position, namely that a "differentiated," special education must be created for a child with a handicap or else "the loss of a normal function in childhood will impede the normal course of psychological development and lead to abnormality, i.e., the emergence of delays and deficiencies,

resulting in abnormal development" (Foman 1978, p. 4). In order to prevent secondary handicaps in the deaf, such as retarded intellectual development, abnormal behavior and lack of speech, "a most important role is played by the pedagogical conditions, in which the child is placed from the moment of the sensory loss" (ibid., p. 5).

Ivan Sokoljanskij (1889-1960) was one of the first defectologists to put Vygotsky's fundamentals into practice. As the founder of the Xar'kov School for the Deaf-Blind, Sokoljanskij applied Vygotsky's idea of dialogical learning, calling it the "principle of shared activity." Following this principle, first the adult was to carry out the entire action himself, then at the final stage the teacher merely provided the signal for action. In this way, Sokoljanskij introduced the "zone of proximal development" in almost pure form. He also employed the concept of interiorization of social relations. The school became well known for its many successful students, some of whom matched Helen Keller with their remarkable achievements in language acquisition and knowledge. During the war, the Xar'kov School was bombed and Sokoljanskij was forced to set up his school again, this time at the Institute of Defectology in Moscow.

Aleksandr Meščerjakov (1923-1974), one of Sokoljanskij's graduated students at the Institute, similarly carried on the Vygotsky tradition by setting up a celebrated special school for the blind-deaf-mute children in Zagorsk. Here the role of "humanized environment and tools" became a guiding principle. In his published study about the Zagorsk program, Awakening to Life, Meščerjakov writes:

> These first elements of human mental processes take shape because the child's needs are satisfied with human objects (clothing, household articles and implements, the paraphernalia of child care) and through human methods (feeding, dressing, use the pot) . . . Child's physical needs become human needs since they are satisfied with the help of human objects and through human methods (Meščerjakov, 1979).

Meščerjakov speaks not only of a humanized environment, but also humanized time, stressing the importance of having a well organized time table. All actions of the child should become elements of the integrated system of behavior; normally this integration is lacking in cases of blind-deaf-mute children. In these children especially everyday concepts appear as scientific: they must be learned systematically with the help of instructors, because these children lack experimental richness and the knowledge of the "simple things" in the world about them.

From this point of view the role of tools is most crucial for the deaf-blind child. He/she must develop in an environment of work, learning to manipulate objects in a socially useful way. In Awakening to Life, Meščerjakov stresses the role of tools in a meaningful interaction with a child's environment.

> The thing does not present itself directly to the subject as the object of his need, but as a tool with its various objective properties . . . The socially evolved mode of action constitutes the social significance inherent in the tool or thing. In this way between the subject (child) and object of his need there comes in a thing (tool) complete with its intrinsic social significance (ibid., p. 292).

In summation, Meščerjakov writes "Only the sum of the above-listed conditions, i.e. the need for practical action, the utilization of social modes of action, and the orientation of action to the satisfaction of needs, makes possible the appropriation by the individual of socially evolved knowledge" (ibid., p. 293).

In light of these two model programs we see that the special school plays an extremely crucial role in the Soviet system educating the handicapped from very early childhood. We learn from the 1978 Ministry of Education report that "for children, born with a hearing loss (the deaf), or those who lost their hearing due to illness in early childhood (the hard of hearing), the USSR has a suffi-

ciently wide network of special preschool institutions, where children from 3-7 are educated, and sometimes from an even earlier age" (ibid., p. 6). Depending upon regional demands, the following types of preschool setups for young deaf children allegedly exist: special kindergartens, preschool boarding homes where children live year round, preschool divisions of the regular boarding schools for the deaf and special groups for the deaf at regular kindergartens. In these special boarding schools (from which children go home only for vacations unless distance to the home permits otherwise), deaf children receive in 12 years the equivalent of 8 years of general educational preparation, the exception being the special emphasis placed on industrial-vocational training for the deaf.

In its 1978 report, the Ministry of Education states that since the 1930's, "the principle of communication has become the guiding principle for teaching language to the deaf" (ibid., p. 12). The report adopts S.A. Zykov's restatement of this view in 1961: "The realization of this goal presumes not only teaching deaf children language for everyday application but also the internalization of language as a basis of verbal thought" (rečevoe myšlenie) (ibid., p. 12). Such statements advance the very essence of Vygotsky's fundamental position on the semiotic dimension of human nature. The use of signs leads humans away from biological to sociohistorical development. In Vygotsky's view, "The most significant moment in the course of intellectual development which gives birth to the purely human forms of practical and abstract intelligence occurs when speech and practical activity, two previously completely independent lines of development converge ([illegible] 1978, pp. 24-25). The acquisition and internalization of language in all children develop higher mental processes when "sign use" is dialectically united with practical activity; such is "the very essence of complex human behavior" (ibid., p. 24). In referring here to signs

Vygotsky was predominantly concerned with speech. He is well known for the statement in Thought and Language: "thought undergoes many changes as it turns into speech. It does not merely find expression in speech, it finds its reality and form" (Vygotsky 1986,p.219).

From this point of view, it is predictable and reasonable that, when implementing a methodology of teaching language to deaf children, scholars and researchers at the Institute of Defectology, place strong emphasis on teaching spoken and written Russian and recommend a variety of sign systems. In keeping with this, the Ministry report states that three forms of verbal language are to be used in deaf schools as a basic means for communication and instruction, all reinforcing the acquisition of speech: 1) spoken language with strong emphasis on the development of residual hearing coupled with lip reading and other special methods; 2) finger spelling; and 3) written language. All three forms of language are considered to be significant sign factors in teaching language to deaf children in the Soviet Union. In this crucial task Vygotsky's fundamental concepts of psychological tools and internalization once again play a role. As we know, Vygotsky thought that different signs may convey one and the same meaning. Various symbolic systems correspond to one and the same content of education. "Let us change signs but retain meaning" (Vygotsky 1983, vol. 5, p. 51). Seen in this light, both Braille, the symbolic system for the blind, and the dactyllic alphabet, the symbolic system for the deaf, will in theory allow a handicapped child to internalize language and reach the same level of cognitive development as the normal child. To achieve this goal teachers in special schools must teach language as a meaningful mode of communication and interaction with others, using all possible tools and sign factors available to the handicapped.

As reported by the Soviet Ministry of Education, today's Soviet educators of the deaf are guided by this principle and employ the above mentioned tripartite system of communication which integrates three sensory-motor systems--sight, touch and residual hearing. Two well known Soviet defectologists, F.F. Rau and N.F. Slezina, first developed this integrated method for teaching speech, i.e., spoken language. This abbreviated systems of phonemes, consisting of eighteen sounds "allows, first of all, for the introduction of speech formation in stages (speech which approximates the pronunciation of these sounds); secondly, it advances a solution to the problem of communication for deaf children" (Foman 1978, p. 14). While the Rau-Slezina method develops spoken language, fingerspelling (daktil'naja rečʼ) reinforces the internalization of speech by facilitating the learning of its written manifestation. As "hand writing in the air," fingerspelling represents item for item what appears on the printed page. Fingerspelling must not, according to the Ministry's report, "be mixed with the mimed-gesticulated language, i.e., the sign language used as the natural form of communication among deaf adults outside of school" (ibid., p. 10). Instead, fingerspelling should accompany the oral articulation of words, integrating sight, sound and touch.

This view goes hand in hand with the theories of Vygotsky's collaborator, Luria, who examined the relationship of tongue movement involved in the "kinesthetic analysis of sounds." According to Luria, "in the absence of this analysis writing becomes much more difficult" (cited in Levitin 1982, p. 11). Concerned with the integrated operations of all the brain's parts, Luria devised an experiment to illustrate the integral role which "kinesthetic analysis of sounds" played in language acquisition:

> When a child is learning to speak or an adult is learning a foreign language, both of them must 'feel' all the speech sounds with their tongue, lips, teeth and palate. If you visit a first-grade class where the pupils are learning to write, you will hear a constant buzz as the children say what they are writing, sound after sound. Some teachers are irritated by the noise in the class. But the wiser ones say that if the children are doing so, they must have a need to do it, and let them go on whispering. We devised an experiment to solve this problem. We divided the class into two groups, in one of which the children were allowed to whisper while they wrote, and in the other, they were told to hold the tip of the tongue between their teeth. The 'mutes' made six times more mistakes. The elimination of sound impeded writing (emphasis added). (ibid.)

Clearly Luria's experimental work has far reaching implications for the advisability of teaching deaf children spoken language.

As has been shown, Vygotsky and his collaborators held up speech as the most crucial sign system in human semiotic activity. Vygotsky was in total agreement with Natal'ja A. Rau (organizer of the first kindergarten for deaf children and author of many books and articles in this field) "on the question of the method of synthetic (sintetičeskij) lip reading for the development of live, logical speech, of verbal thought, and for the reinforcement of bonds between deaf-mute preschool children and the hearing world. On the basis of this method a link is formed between concepts and 'the picture of the movement of mouth' ... and tongue, so that pronunciation becomes internalized" (Vygotsky 1983, vol. 5, p. 351).

Fundamentals of Defectology represents an evolution of Vygotsky's views of sign language as a meaningful linguistic system for development of verbal thought in the deaf. In his earlier work (1924-1925) he appeared to reject "mimicry" (a Russian synonym for the mimed gesticulated language of the deaf) as a viable means of communication with and instruction of the deaf in classrooms. On the other hand, he viewed the languages of gestures as a natural language for the deaf, but on the other this very "naturalness" of gestures prevented, from Vygotsky's point of view, a full development of linguistic abilities in deaf (Vygotsky 1983,vol.5,pp.77-78). Although Vygotsky first believed that sign language, i.e. "mimicry" could not serve as an instrument of abstract-logical thinking, he later came to the conclusion that fuller development of deaf children dictates an expansion of the system of verbal means used in educational process: "One must reevaluate the tranditional, theoretical and practical attitude toward the various individual forms of speech used by the deaf-mute, and above all toward mimicry" (Ibid,p.217). In this respect Vygotsky held a very innovative position stating that sign language is an "authentic lenguage with an entire wealth of functional significance"(Ibid,p.215). This recognition of sign language ("mimicry") as a developed communicative system allowed Vygotsky at later satges of his activity to determine the uniqueness of a deaf child's development as a development under conditions of "polyglossia". He considered that polyglossia -- the acquisition of speech by various verbal means, is the most productive path of development and growth for a deaf child, and in connection with this that the maximal use of all forms of speech available to a deaf-mute child is necessary condition for radical improvement in his/her education (Ibid,pp.218-219).

Before making the case that the present stage of the methodology for the education of the deaf is justified in extending Vygotsky's theoretical views to include this alternative significant sign system, let us reexamine Vygotsky's basic position in what concerns the use of different sign systems as a means of semiotic mediation of practical activity. As previously stated, development of higher mental functions occurs whenever a sign is united with an object of action

in a meaningful way. We repeat, for Vygotsky the semantics of the underlying object/sign or act/sign relationship is significant, not the sign in itself.

In his analysis of the multifaceted nature of human "signed" activity, Vygotsky did not concern himself with the study of the spoken word alone. For example, when he examined the dialogue between characters in Lev Tostoy's Anna Karenina, he noticed that "mutual perception" between intimate partners understand each other so well that their inner speech is made intelligible to one another by a mere glance, gesture, and so forth. In Thought and Language, Vygotsky observed from his experiments that when inner speech seemed to be at the forefront, vocalization decreased: "When we converse with ourselves, we need even fewer words than Kitty and Levin did. Inner speech is speech almost without words ... Inner speech works with semantics, not phonetics" (Vygotsky 1986,p.244).

In the same light, Vygotsky took great interest in the dramaturical method of K. Stanislavskij (1863 - 1938), because the famous theater director insisted that his actors master the underlying psychology of a role before learning the words, gestures and actions. Here meaning precedes words. In Thought and Language, Vygotsky writes: "The theater faced the problem of thought behind the words before psychology did. In teaching his system of acting, Stanislavsky required the actors to uncover the "subtext" of their lines in a play" (Vygotsky 1986,p.250).

Vygotsky attempted to establish the very essence of inner speech, which, he believed, "is to a large extent thinking in pure meaning" (Ibid,p.249). In his early studies of semiotic activity, together with Luria, Leontiev and others (Zaporožec, Slavina, Levina, Božović and Morozova), Vygotsky set up an experimental lab at the Krupskaja Academy to deal with pictography, i.e., a method of

studying what Vygotsky called indicative activity, i.e., the mental process whereby signs, tools and instruments are invented" (cited by Luria in Levitin 1982, p. 162). In these experiments, children who had already grasped concepts such as "happiness" or "fidelity" from their own practical experience were asked to depict these difficult concepts in signs. According to Luria, in spite of the difficulty some adults would have describing these concepts in words (usually many words), these children "almost invariably came up with some signs" (ibid.). In such cases, thought was adequately expressed in means other than words. In the same light Vygotsky was fond of citing the example of a knot tied in a handkerchief as a mnemonic device. This example, however primitive, serves to illustrate how an external, nonverbal sign (here the knot) can be united with a simple mediated act in order to "control one's own behavior and organize mental operations" (Levitin 1982, p. 172). In Luria's words, "Vygotsky was engaged in the study of the semantic and systems structures of human consciousness until his last days" (ibid).

Luria continued Vygotsky's study of "signed activity" by observing the communication between young children and their mothers. In an interview granted to the American psycholinguist, Michael Cole, in the 1970's, Luria pointed out the importance of "sense" conveying gestures in the initial stages of ontogenesis of speech. He gave an example where language influence would seem to be minimal while the gesture directed at a tool takes on maximum significance. A mother helps direct her child's attention to a specific object (tool) which will have a significant function for the child:

> She changes the child's perception by pointing and naming the object. The pointing and naming isolate the cup from the rest of the environment and make it a figure set against a background. (Levitin 1982, p. 166)

Luria concluded that such gestures accompany words only in the first stage of language development and are often totally absent once a child has internalized the concept. Yet, in spite of the primitiveness of such single gestures or operations), the semantics of inner speech remains the same even when the child later learns to replace the external sign with many words in order to describe the function of the isolated object. The experiments carried on by Vygotsky and Luria on the question of alternative nonverbal sign factors have demonstrated that the gesticulated language of children and adults is a very natural and significant means of communication. Such experimental work paves the way for a serious, scientific examination of the mimed-gesticulated sign language system of the deaf.

In comparison with the simple gesticulated language of children, recent studies indicate that the sign language of deaf adults is a highly developed sign system and can be used to mediate practical and abstract activity at a high level of mental operations. Linguists have only recently begun to study the complexity and scope of this mode of communication, coming to the conclusion that it is a viable alternative sign system for the deaf. Still this notion has been slow in coming and is still a topic of much controversy among both Soviet and American linguists.

According to the definition given in the Defectological Dictionary compiled by members of the Institute of Defectology (Moscow 1970) "Sign Language" or "Mimed-gesticulated Language" was still considered to be a rather primitive form of communication among the deaf (D'jačkov 1970, p. 198). Its 'limitations', according to this dated definition, are elaborated as follows: 1) meanings of signs do not always correspond with word meanings (the verb "to fly" is given as an example of this because the sign will differ depending upon the context); 2) the overall number of signs is considerably less than the number of words

existing in spoken language (there are very few or no signs, for example, for certain generic categories, such as "clothes," "transportation," etc.); while at the same time; 3) certain concrete or specific labels cannot be differentiated ("bonfire," "fire," "light," "dream," "day dreaming," "fantasy," etc.). In general, the structure and syntax of sign language is characterized here as an approximation of simplified or spoken dialogue which develops only primitive forms of cognition (ibid., p. 198). Implicit here is the recognition that such a system of communication has not yet achieved the higher level of historical-cultural development characteristic for the dominant spoken and written sign and therefore its use will not allow a child to fully develop the inner semantics of verbal thought and written sign. The 1978 report by the Ministry of Education is only slightly less negative in its assessment of "Mimed-gesticulated language."

In the past few years, however, just as in the United States, researchers at the Institute of Defectology have begun to carefully analyze the structure and complexity of sign language. In particular, Galina Zajceva has advanced the position that the sign language of the deaf does not limit mental thought to concrete ideas and, more importantly, that, as the language most natural for the deaf, it is rich in meaning, inflection and linguistic structure. If this assessment is true, then based on Vygotsky's insistence of the priority of semantics, mimed-gesticulated language is a significant alternative sign system for the deaf. Zajceva's laudable efforts to advance a new understanding of "conversational gesticulated language" are more clearly illustrated in her book, Use of Sign Language at Lessons of Literature in the Evening Schools for the Deaf and the Hearing Impaired (1981). Here she points out that the process of language acquisition for a deaf child (with deaf parents) by means of Sign Language is much the same as it is for the hearing child, i.e., "the process of communication with

others." If Vygotsky's prerequisite for a sign system is that it must be a "live" and "meaningful" communicative form of language, then from this point of view, mimed-gesticulated language plays the same role for the deaf child as spoken language for the hearing child in ontogenesis of cognition.

Referring repeatedly to research by American linguists (in particular, W.C. Stokoe), Zajceva describes the specific, grammatical structure of mimed-gesticulated language. She also outlines the three structural elements of signs which correspond to the phonemes of words: 1) the configuration of the hand; 2) the spatial position of the hand; and 3) the type of movement (Zajceva 1981, p. 29).

"Syncretism," a term used earlier by Luriâ to describe "semantic heaps" or levels of meaning in a word (Luria 1981, pp. 52-55), is also characteristic of mimed-gesticulated language or Russian Conversational Sign Language, as it is described by Zajceva. Here syncretism refers to the "polysemy" or multiple meanings of a single gesture (Zajceva 1981, p. 25). Just as in spoken language, the sense (smysl) of a specific gesture is selected and all other meanings excluded in the process of the communicative act, i.e., in a given situation or context. The application of this Vygotsky-Luriâ notion of semantics to Russian Sign Language helps support the view that the mimed-gesticulated language of the deaf is not a primitive but a complex alternative sign system: syncretism or complexity of word meanings reflects an advanced stage of language acquisition -- as language develops so does meaning.

To support her study of Russian Conversational Sign Language, Zajceva cites the research of A.P. Gozova, T.B. Rozanova, N.V. Čulkov, and N.V. Jaškova, who observed "the high effectiveness and osmyslennost' zapominanija of signs in the deaf" (Zajceva 1981, p. 9). Zajceva also based her deductions on her own observations of deaf students from the evening division of classes at the Institute.

Her experimental subjects from various age groups all recalled signs better than words (ibid., p. 9). Moreover, in the study of literature, they demonstrated a better understanding, when signs were used to accompany words. For example, literary concepts of general and analytical categories, such as "artistic image," "plot," "character," "romanticsm," "critical realism," etc., were better comprehended and retained in the memory longer when they are introduced with the help of sign language (Zajceva 1981, pp. 12-13). If sign language does in fact more successfully convey the meaning of abstract concepts to a deaf child, then obviously, from the Vgotskian point of view of semantics, it is useful as one of the alternative systems in an integrated program for developing higher psychological and mental processes in the deaf.

The intent of this collaborated study has been an examination of principles proposed by Vygotsky as the basis for modern Soviet Defectology and, in particular, as they are applicable to a special area of concern--special education for the deaf. The real advantages of these corrective methods and their practical application within the Soviet Union go well beyond the scope of our work. This presents a challenge for subsequent research in the USSR in collaboration with Soviet defectologists and educators. Needless to say questions do arise from such an approach. Researchers at the prestigious Moscow Institute of Defectology assert that only a truly differentiated learning environment can fully develop a deaf child's cognitive skills and overall personality because only in the specially manipulated setting proposed by Vygotsky and his followers will the entire staff be able to exclusively serve the individual needs of a handicapped child, building on strengths and uniqueness, not on handicaps. By contrast, American educators, now generally committed to the mainstreaming of all "handicapped" children, will respond to this by asking: "How can a deaf child, or any

other "handicapped" child, grow into a normal, well adjusted and useful member of society if, from an early age, he is severed from society at its roots, from his family, and placed in an isolated, "hot house," environment?" Each pedagogical system would seem to have its own advantages, and critical assessment of this controversy is the topic for another study.

Still, in final analysis, we would hope that this paper has shown that current Soviet defectologists have inherited from Vygotsky and his research collaborators firm principles on which to build, namely the principles of shared activity or dialogical learning, the uniqueness of every child, the internalization of sign factors and tools, the priority of semantics, and lastly, the principle of rehabilitation. Vygotsky is to be commended for rejecting philanthropic welfare and the notion of "being handicapped." He rightly calls attention to the fact that these children are only handicapped in the eyes of others and do not perceive themselves as "defective" (Vygotsky 1983, vol. 5, p. 51). We conclude our assessment by quoting a statement which best illustrates Vygotsky's belief in the miraculous, inexhaustible potential of higher mental functions inherent in all humans:

> The world pours, through a large funnel, as it were, in thousands of stimuli, drives and callings; inside the funnel are constant struggles and clashes, all the excitations issue from the narrow end as response reactions of the organism in greatly reduced quantity. The actualised behaviour is but in infinitesmal part of the possible behaviour. Man is full of unrealized opportunities at any given moment. These unrealized opportunities for behaviour, the desparity between the broad and narrow ends of the funnel is an indisputable reality, just as real as the reactions which have prevailed (quoted in Levitin 1980, p. 130).

Certainly this enriched, holistic psychology of human nature, bequeathed to us by Vygotsky, demands great respect and further attention in the West by psychologists, linguists and pedagogues .

Footnotes

1. The afterword to this volume of Vygotsky's collected works explains that many of the articles and reports from which this book is compiled "are published here for the first time and date back to the 1920's, at which time Vygotsky combined his scientific research at the Institute of Psychology with work at NARKOMPROS (The People's Committee for Education) in the subdivision for education of "defective (handicapped) children" (Vygotsky 1983, vol. 5, p. 333). In 1925-26 he organized a laboratory for the psychology of abnormal childhood in the Medical-Pedagogical Sector of Narkompros housed at 8 Pogodinskaja St. in Moscow. This laboratory later became known as the Experimental-defectological Institute of Narkompros and today is formally called the Scientific Research Institute of Defectology of the Academy of Padagogical Sciences of the USSR (NII APN SSR). In the last years of his life (1930's) Vygotsky became the Institute's Director. The bulk of his writings about his research in the area of defectology never appeared in print before 1983, mainly for the reason that he left behind a huge collection of unpublished paper While some were published as articles in the 1920's, the majority appeared in book form only after Sif, Vlasova and other members of the Institute of Defectology worked many years to compile and edit them for final publication.

   An English translation of this collection of Vygotsky's writings on defectology (translated and edited by Jane Knox and Kira Stevens) will soon be published by Plenum Press, N.Y.

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